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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,456	11/26/2003	Paul R. Sharps	1002	5958

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EXAMINER

DIAMOND, ALAN D

ART UNIT PAPER NUMBER

1753

DATE MAILED: 07/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/723,456

Applicant(s)

SHARPS ET AL.

Examiner

Alan Diamond

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 April 2004 and 14 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 33-47 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 33-47 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 November 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 11262003.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference character(s) mentioned in the description: reference sign 207, which appears at page 4, line 31. Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.
2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: reference sign 111 in Figure 1; and reference sign 203 in each of Figures 2A, 2B, and 2C. Corrected drawing sheets, or amendment to the specification to add the reference character(s) in the description, are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct

any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities: On the cover page for the instant application, i.e., the page before page 1 of the specification, the inventor's name "Brad Clevenger" should be changed to "Marvin Brad Clevenger" so as to be consistent with the instant inventor's declaration. It is noted that in the Reference to Related Applications section on page 1 of the specification, Serial No. 10/280,593 has been allowed. Applicant should insert the patent number when it becomes available. Appropriate correction is required.

Claim Objections

4. Claims 36 and 47 are objected to because of the following informalities: In claim 36, at each of lines 1 and 2, the word "such" should be changed to "said". In claim 47, at line 5, the term "leasat" should be changed to "least". Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 33-37, 41, 42, and 44-47 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 9-64397, herein referred to as JP '397.

With respect to instant claim 33, and as seen in Figure 2, JP '397 teaches a solar cell module comprising a multijunction solar cell (201) including first (204A,205A,206A) and second (204B,205B,206B) solar cells on a substrate (203); and bypass diode (202) that is integral to the first solar cell by way of common layer (205A), wherein said bypass diode reads on the instant means integral to a portion of the first solar cell for passing current when the multijunction solar cell is shaded (see also paragraphs 0031, 0036, and 0041-0043). As seen in Figure 2, the multijunction solar cell (201) is formed on a first portion of the substrate (203) and the bypass diode (202) is formed next to the multijunction solar cell (201) on a second portion of the substrate (203). The diode (202) and the multijunction solar cell (201) share layers (205A) and (204B) that are epitaxially grown in the same process (see paragraph 0042). As seen in Figure 2, the diode (202) is connected across the first and second solar cells to protect the cells from reverse biasing (see also paragraph 0036). The diode (202) can have a Schottky contact (see paragraph 0055). With respect to claim 44, the substrate (203) can be glass coated with a metal or ITO coating (see paragraph 0066), and said metal or ITO coating then reads on the instant lateral conduction layer.

With respect to claims 41 and 45-47, note JP '397's Figure 1 which has the multijunction solar cell (101) laterally spaced apart from the bypass diode (102). The metal or ITO layer on the glass substrate (103) then reads on the instant lateral

conduction layer, and/or said metal layer on the glass substrate reads on the instant metal layer. Additionally, the metal layer (108D) also reads on the instant metal layer.

Since JP '397 teaches the limitations of the instant claims, the reference is deemed to be anticipatory.

7. Claims 33-37, 41, 42, and 44-47 are rejected under 35 U.S.C. 102(b) as being anticipated by Taylor, GB 2346010 A. See Figures 1c and 1d and pages 5-6 of Taylor, which set forth the features of the instant solar cell semiconductor device. Since Taylor teaches the limitations of the instant claims, the reference is deemed to be anticipatory.

8. Claims 33-38, 41, 42, and 44-47 are rejected under 35 U.S.C. 102(b) as being anticipated by Hilgarth, EP 1056137 A1. See Figures 8 and 9 and paragraphs 0053-0060 of Hilgarth, which set for the features of the instant solar cell semiconductor device. Note that Hilgarth teaches that its substrate can be Ge (see paragraph 0043). Since Hilgarth teaches the limitations of the instant claims, the reference is deemed to be anticipatory.

9. Claims 33-47 are rejected under 35 U.S.C. 102(b) as being anticipated by Ho et al, WO 99/62125. See Figure 14B which has the instant multijunction solar cell with Ge substrate, and GaAs (1412,1414) and GaInP (1422,1424) solar cells, and integral bypass diode (1410) that is integral with a portion of the GaAs solar cell and laterally spaced therefrom. Either layer (1406), (1408) and/or (1430) read on the instant lateral conduction layer. Layer (1440) reads on the instant metal layer. Since Ho et al teaches the limitations of the instant claims, the reference is deemed to be anticipatory.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 33-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taylor, GB 2346010 A, in view of Marvin et al, "Evaluation of multijunction solar cell performance in radiation environments, Conference Record of the 28th Photovoltaic Specialists Conference, pages 1102-1105, published 15-22 September 2000, and Lillington et al, U.S. Patent 5,853,497.

See Figures 1c and 1d and pages 5-6 of Taylor, which set forth the features of the instant solar cell semiconductor device. Taylor teaches that its substrate (1) can be GaAs (see page 5, line 4). Taylor does not specifically teach that its substrate (1) can be Ge, and that its solar cell (5) is GaAs and its solar cell (2) is InGaP. Marvin et al teaches the conventional GaInP/GaAs/Ge two junction device wherein the Ge is the substrate (see the entire document). Lillington et al is relied upon for showing what is well-known in the art, i.e., that GaInP/GaAs can be grown on either a GaAs substrate or a Ge substrate (see col. 1, line 65 through col. 2, line 16). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a Ge substrate in Taylor's multijunction solar cell in place of the GaAs exemplified by Taylor, and to have used GaInP and GaAs for Taylor's solar cells because GaInP/GaAs can be grown on either a GaAs substrate or a Ge substrate as shown by Lillington et al, and

because the GaInP/GaAs/Ge two junction device wherein the Ge is the substrate is conventional in the art, as shown by Marvin et al.

12. Claims 33-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hilgarth, EP 1056137 A1, in view of Marvin et al, "Evaluation of multijunction solar cell performance in radiation environments, Conference Record of the 28th Photovoltaic Specialists Conference, pages 1102-1105, published 15-22 September 2000, and Lillington et al, U.S. Patent 5,853,497.

See Figures 8 and 9 and paragraphs 0053-0060 of Hilgarth, which set for the features of the instant solar cell semiconductor device. Note that Hilgarth teaches that its substrate can be Ge (see paragraph 0043). Hilgarth does not specifically teach that its solar cells in figures 8 and 9 are formed from GaAs and InGaP. Marvin et al teach the conventional GaInP/GaAs/Ge two junction device wherein the Ge is the substrate (see the entire document). Lillington et al is relied upon for showing what is well-known in the art, i.e., that GaInP/GaAs can be grown on either a GaAs substrate or a Ge substrate (see col. 1, line 65 through col. 2, line 16). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used GaInP and GaAs for Hilgarth's solar cells because GaInP/GaAs can be grown on a Ge substrate as shown by Lillington et al, and because the GaInP/GaAs/Ge two junction device wherein the Ge is the substrate is conventional in the art, as shown by Marvin et al.

Double Patenting

13. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11

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F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

14. Claims 33-47 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-35 of U.S. Patent No.

6,680,432. Although the conflicting claims are not identical, they are not patentably distinct from each other because the additional required third photovoltaic subcell is not excluded from the instant claims.

15. Claims 33-47 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-9 of U.S. Patent No.

6,278,054. Although the conflicting claims are not identical, they are not patentably distinct from each other because the multijunction solar cell in the claims of said patent have the instant solar cells and diode.

16. Claims 33-47 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-27 of U.S. Patent No.

6,600,100. Although the conflicting claims are not identical, they are not patentably distinct from each other because the multijunction solar cell in the claims of said patent have the instant solar cells and diode.

17. Claims 33-47 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 21-30 of copending Application No. 10/336,247. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of said copending application have the instant at least one multijunction solar cell and bypass diode.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

18. Claims 33-47 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 2-36 of copending Application No. 10/280,593. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of said copending application have the instant at least one multijunction solar cell and bypass diode.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 6,316,716 (Hilgarth) is of the same patent family as EP 1056137 A1. Also made of record are 6,103,970, 6,359,210, 2003/0140962, 6,635,507, and 2004/0040593.

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alan Diamond whose telephone number is 571-272-

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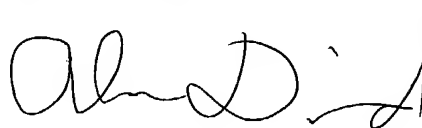
1338. The examiner can normally be reached on Monday through Friday, 5:30 a.m. to 2:00 p.m. ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Alan Diamond
Primary Examiner
Art Unit 1753

Alan Diamond
June 29, 2004

A handwritten signature in black ink, appearing to read 'Alan Diamond', with a stylized flourish at the end.